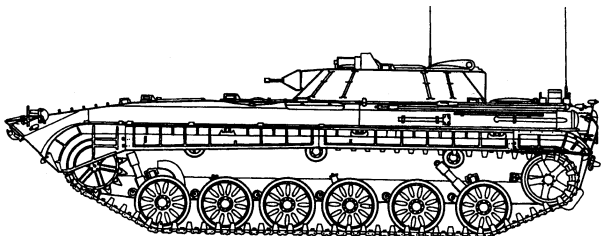
Russian Artillery Mobile Reconnaissance Vehicle PRP-3/PRP-4M



Weapons & Ammunition Types	Typical Combat Load
7.62 PKT MG	2,000

SYSTEM
Alternative Designations: None
Date of Introduction: 1975
Proliferation: At least 1 country
Description:
Crew: 5
Platform (chassis): BMP-1
Combat Weight (mt): 13.2
Chassis Length Overall (m): 6.73
Height Overall (m): 2.14
Width Overall (m): 2.94

Automotive Performance:
Engine Type: 293-hp Diesel
Cruising Range (km): 600
Speed (km/h):
- Max Road: 60
- Max Off-Road: 35
- Cross-Country: INA
- Max Swim: 7

Fording Depths (m): Amphibious

Radio: R-173

Protection:
Armor, Turret (mm): 23
Armor Hull (mm): 19
Self-Entrenching Blade: No
NBC Protection System: Yes
Smoke Equipment: Vehicle engine exhaust smoke system (VEESS)

ARMAMENT
Main Armament:
Caliber, Type, Name: 7.62-mm machinegun PKT
Mount Type: coax
Direct Fire Range (m): 1,300
Max Effective Range (m):
- Day: 1,000 / 400-500 on the move
- Night: 800

Fire on Move: Yes
Rate of Fire (rpm): 600 cyclic in 2-10 round bursts

VARIANTS
None

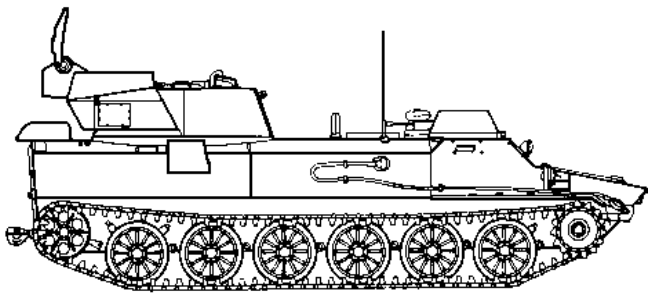
SENSORS/COMPONENTS

PRP-3 Sensors/Components:
Navigation: 1G25 gyrocompass and 1G13 gyro course indicator Fire
Direction: 1V520 Ballistic Computer
Right Side Sensors: 1PN61 Night Vision sensor and 1D11 Laser Rangefinder
Left Side Sensors: None
Radar: 1RL126 Small Fred Radar
- Operating Band: K (36.2 – 37.0 GHz)
- Detection Range: 20 km
- Tracking Range: 7–12 km

PRP-4 Sensors/Components:
Navigation: 1G25-1 gyrocompass and 1G13 gyro course indicator
Fire Direction: 1V520 Ballistic Computer
Right Side Sensors: 1PN61 Night Vision sensor and 1D11M-1 Laser Rangefinder
Left Side Sensors: 1PN59 Thermal Imaging Night Vision Device and 1D14 Laser Rangefinder
Radar: 1RL133M-1 Tall Mike Radar
- Operating Band: I (9.0 GHz)
- Detection Range (personnel): 3.0 km
- Detection Range (vehicle): 12 km

NOTES
The PRP-4M has improved 1PN71 night vision sensors. The vehicles are also equipped with a NBC filtration and overpressure system.

Russian Battlefield Surveillance Radar SNAR 10



SNAR 10 with radar raised and the turret mounted 7.62 PKT MG pointed to the rear

Weapons & Ammunition Types	Typical Combat Load
7.62 PKT MG	2,000

SYSTEM
Alternative Designations: BIG FRED, 1RL232, 1RL232-1
Date of Introduction: 1975
Proliferation: At least 12 countries
Description:
Crew: 5
Platform (chassis): MT-LBu
Combat Weight (mt): 12.6
Chassis Length Overall (m): 7.62
Height Overall (m): 2.72 (est.)
Width Overall (m): 2.85

Automotive Performance:
Engine Type: YaMZ-238, 240 hp diesel
Cruising Range (km): 500 km
Speed (km/h):
- Max Road: 60
- Max Off-Road: 26
- Cross-Country: INA
- Max Swim: N/A

Fording Depths (m): INA

Radio: R-123M radio, 2 each

Protection:
Armor, Turret Front (mm): 20
Armor Turret Top (mm): INA
Armor Hull (mm): 15
NBC Protection System: Yes
Smoke Equipment: No

ARMAMENT
Main Armament:
Caliber, Type, Name: 7.62-mm machinegun PKT
Mount Type: Coax
Direct Fire Range (m): 1,300
Max Effective Range (m):
- Day: 1,000 / 400-500 on the move
- Night: 800

Fire on Move: Yes
Rate of Fire (rpm): 600 cyclic in 2-10 round bursts

VARIANTS
None

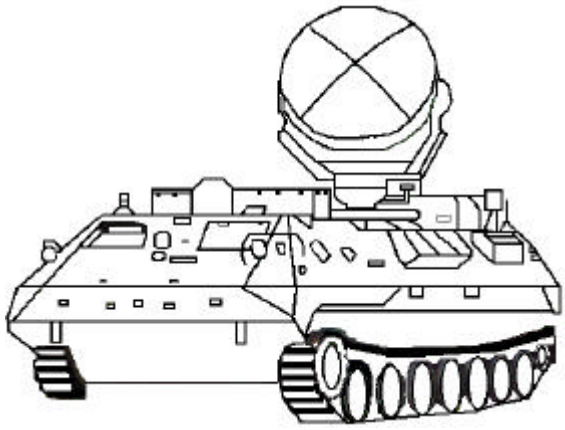
RADAR
Performance Capability
Antenna Type: Parabolic
Operating Band: K (34.55 to 35.25 GHz)
Detection Range Against Moving Targets, Without MTI (km):
- Vehicles: 16.0
- Ships: 30.0
- Shell Impact: 10.0

Detection Range Against Moving Targets, With MTI (km):
- Vehicles: 10.0

Emplacement Time (minutes): 5.0
Displacement Time (minutes): 5.0

NOTES
The primary mission of the Big Fred radar is to detect and track both moving ground and water surface targets. Additionally, the radar can be used to provide friendly fire correction data to artillery units. The SNAR 10 is not capable of amphibious operations (unlike other members of the MT-LBu family) due to the heavy turret. The vehicles are also equipped with a NBC filtration and overpressure system.

Russian Artillery Locating Radar ARK-1M Rys



SYSTEM
Alternative Designations: None
Date of Introduction: 1986
Proliferation: At least 1 country
Description:
Crew: 4
Platform (chassis): MT-LBu
Combat Weight (mt): 15.7
Chassis Length Overall (m): 7.62
Height Overall (m): 2.72
Width Overall (m): 2.85

Automotive Performance:
Engine Type: YaMZ-238, 240 hp diesel
Cruising Range (km): 500 km
Speed (km/h):
- Max Road: 60
- Max Off-Road: 26
- Cross-Country: INA
- Max Swim: 4.5

Fording Depth (m): Amphibious

Radio: R-123M radio

Protection:
Armor, Turret Front (mm): 20
Armor Turret Top (mm): INA
Armor Hull (mm): 15
NBC Protection System: Yes
Smoke Equipment: No

RADAR
Antenna:
Antenna Type: Reflector

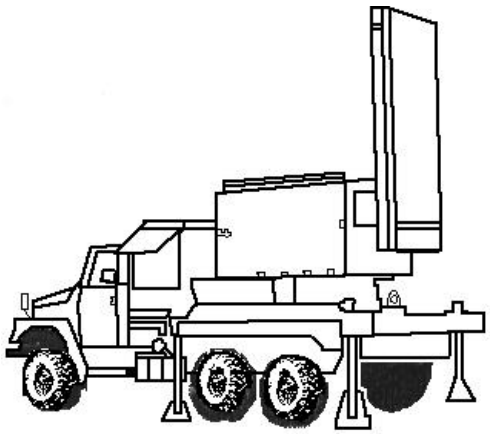
Receiver:
Noise Figure (dB): 8.0

Performance Capability
Detection Range (km):
- Mortar: 13.0
- Gun/howitzer: 8.0
- MLRS: 25.0
- Tactical Missile: 30.0

Max Number of Targets (tracks/min): 3
Emplacement Time (minutes): 5.0
Displacement Time (minutes): 5.0

NOTES
The ARK-1M power supply is located on the rear of the vehicle.

Chinese Artillery Locating Radar BL-904



SYSTEM
Alternative Designations: Type 704 and Type 704M
Date of Introduction: 1991
Proliferation: Ready for production
Description:
Crew: 4
Platform (chassis): Dong Feng EQ2100E6D, 2500 kg, 6x6
Combat Weight (mt): 11.5
Chassis Length Overall (m): 6.84 (est.)
Height Overall (m): INA
Width Overall (m): 2.40 (est.)

Automotive Performance:
Engine Type: Cummins 6BT5.9 Diesel
Cruising Range (km): INA
Speed (km/h):
- Max Road: 85
- Max Off-Road: INA
- Cross-Country: INA
- Max Swim: N/A

Fording Depths (m): 0.9

Radio: INA

RADAR
Antenna:
Antenna Type: Phased-Array
Antenna Gain (dBi): 43.3
Mode: Search
- Scan Method: Electronic
- Scan Type: Sector (azimuth)
- Scan Width (deg):
  - Narrow: 30.0
  - Wide: 90.0

Mode: Verification
- Scan Method: Electronic
- Scan Type: Nonperiodic

Mode: Track
- Scan Method: Electronic
- Scan Type: Nonperiodic

Transmitter:
Transmitter Type: Traveling Wave Tube
RF minimum (GHz): 8.0
RF maximum (GHz): 12.0
Mode: All

Receiver:
Noise Figure (dB): 8.0
Single Pulse Processing: Coherent
Multiple Pulse Processing: Doppler Filters

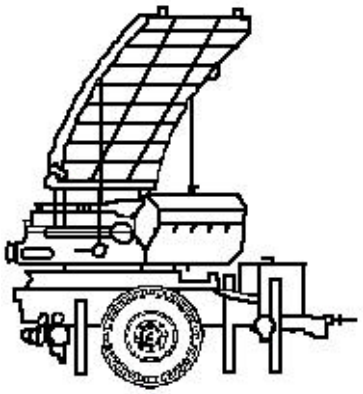
Performance Capability
Detection Range, Wide Scan Mode (km):
- 82-mm Mortar: 15.0
- 122-mm Howitzer: 16.0
- 155-mm Howitzer: 18.0

Detection Range, Narrow Scan Mode (km):
- 122-mm Howitzer: 20.0
- 155-mm Howitzer: 25.0
- 273-mm Rocket: 30.0

Max Number of Targets (tracks/min): 8
Emplacement Time: 10.0 (2 vehicle configuration)
Displacement Time: 10.0 (2 vehicle configuration)

NOTES
Versions of the BL-904 have been offered for sale by NORINCO Industries since at least 1991. While China's army is a prime candidate for the deployment of the BL-904, there is no evidence of it being fielded to operational units. Additionally, the system has not been exported. It was initially named the Type 704. Later an improved-performance version was called the Type 704M. The system is similar to the U.S. AN/TPQ-36 in both appearance and performance (as claimed by the manufacturer). The system can be used to track friendly artillery fire. The system calculates the impact error of friendly artillery rounds and provides automatic correction parameters for increased accuracy. The radar system is employed as a two-vehicle set. One vehicle carries the radar while the other vehicle carries the command cabin and the system power supply. The command cabin contains the operation and control panel, data processing equipment, computer monitors/displays, etc.

British Artillery Locating Radar Cymbeline



Alternative Designations: MUFAR/PIF-518
Date of Introduction: 1973
Proliferation: At least 3 countries
Description:
Crew: 3
Platform (chassis): MK 1 version trailer
Combat Weight (kg): 980
Chassis Length Overall (m): 2.90 (transit)
Height Overall (m): 1.80 (transit)
Width Overall (m): 1.78 (transit)

Automotive Performance:
Cruising Range (km): INA
Speed (km/h):
- Max Road: INA
- Max Off-Road: INA
- Cross-Country: INA
- Max Swim: N/A

Fording Depths (m): .75

Radio: INA

RADAR
Antenna
Antenna Type: Reflector

Search Mode:
- Scan Method: Mechanical
- Scan Type: Sector
- Scan Width (°): 40

Transmitter
Transmitter Type: INA
RF Minimum (GHz): 8.0
RF Maximum (GHz): 12.0
Mode: Search

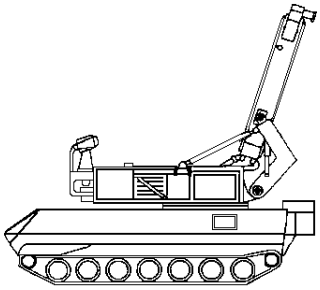
Receiver
Noise Figure (dB): INA
Multiple Pulse Processing: MTI Optional

Performance Capability
Detection Range (km):
- Min: 1.0
- Max: 20.0

Max Number of Targets (tracks/min): 3
Emplacement Time (min): 10.0
Displacement Time (min): 10.0

NOTES
The primary power source for the Cymbeline radar is a Wankel-engined driven generator delivering 1.5 kW at 28 volts d.c. The generator is capable of operating for a period of eight hours prior to refueling. Normally, the radar is transported on a two-wheeled trailer towed behind a prime mover like a Land Rover (or similar type vehicle). Four men for short distances can carry the radar. Additionally, the Cymbeline radar may be mounted on a self-propelled vehicle like the British FV432 Armored Personnel Carrier.

Russian Artillery Locating Radar IL-219



Alternative Designations: Zoopark-1
Date of Introduction:
Proliferation: At least 1 country
Description:
Crew: 3
Platform (chassis): MT-LBu
Combat Weight (mt): INA
Chassis Length Overall (m): 7.62
Height Overall (m): 2.72
Width Overall (m): 2.85

Automotive Performance:
Engine Type: YaMZ-238, 240 hp diesel
Cruising Range (km): 500
Speed (km/h):
- Max Road: 60
- Max Off-Road: 26
- Cross-Country: INA
- Max Swim: 4.5

Fording Depths (m): Amphibious

Radio: R-123M radio

RADAR
Antenna
Antenna Type: Phased-Array
Antenna Gain (dBi): 40.0
Search Mode:
- Scan Method: Electronic
- Scan Type: Sector
- Scan Width (°): 60

Verification Mode:
- Scan Method: Electronic
- Scan Type: Nonscanning
- Scan Width (°): N/A

Track Mode:
- Scan Method: Electronic
- Scan Type: Nonperiodic
- Scan Width (°): 6 (azimuth - nominal value indicated, equal to 10% of the maximum scan)
- Scan Width (°): 4 (elevation - nominal value indicated, equal to 10% of the maximum scan)

Transmitter
Transmitter Type: INA
RF Minimum (GHz): 6.0
RF Maximum (GHz): 8.0
Mode: All

Receiver
Noise Figure (dB): 5.0
Single Pulse Processing: INA
Multiple Pulse Processing: INA

Performance Capability
Detection Range (km):
- 81-mm Mortar: 12.0
- 120-mm Mortar: 15.0
- 105-mm Howitzer: 8.0
- 155-mm Howitzer: 10.0
- 122-mm Rocket: 12.0
- 220-mm Rocket: 20.0
- Tactical Missile: 35.0

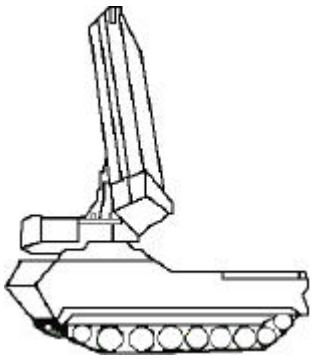
Max Number of Targets (tracks/min): 12
Emplacement Time (min): 5.0
Displacement Time (min): 5.0

NOTES
The Zoopark-1 automated multifunctional reconnaissance and control complex consists of the IL259 radar mounted on a MT-LBu chassis, IL30 maintenance van on a URAL-43203 truck, and the trailer-mounted ED30-T230P-1RPM power station. The MT-Lbu engine driven generator allows for autonomous operation. The ED30-T230P-1RPM power station provides power during vehicle and radar maintenance.

The Zoopark-1 is capable of tracking friendly artillery fire. The system calculates the impact error of friendly artillery rounds and provides automatic correction parameters for increased accuracy. Additionally, the system is also capable of controlling (simultaneously) several remote piloted vehicles (RPVs) using an automatic screen indication with a topographic mapping of calculated and real RPV flight routes. The radar is capable of conducting air traffic control around an airfield or operating area. The radar tracks and establishes the current position of aircraft in the operating area of responsibility and provides real-time data transmission of data received to the air control center.

The antenna beam is electronically phase-steered in azimuth and elevation. The reflect-array is composed of 3328 phase shifters, space-fed by a monopulse horn located on the front side of the array and electronics enclosure. After coming into position, and after the array is raised from the travel position, it is rotated so that its boresight is centered in the assigned coverage sector. The search scan elevation angle is probably fixed, nominally at a low angle in the range of 30 to 50 mils. The search mode will be interrupted by verification and track mode scans during periods when targets are detected. Verification is most likely a non-scanning mode, with the beam pointed at the same elevation angle as the search scan. Also, verification may be repeated for some targets. During the track mode, the radar tracks the target by scanning in both azimuth and elevation.

Ukrainian Artillery Locating Radar IL-220U



Alternative Designations: None
Date of Introduction: Ready for production
Proliferation: At least 1 country
Description:
Crew: INA
Platform (chassis): GM-5951 ATV
Combat Weight (mt): 39.6
Chassis Length Overall (m): 9.42
Height Overall (m): 3.35
Width Overall (m): 3.25

Automotive Performance:
Engine Type: INA
Cruising Range (km): INA
Speed (km/h):
- Max Road: 60
- Max Off-Road: INA
- Cross-Country: INA
- Max Swim: INA

Fording Depths (m): INA

Radio: INA

RADAR
Antenna
Antenna Type: Phased-Array
Antenna Gain (dBi): INA
Search Mode:
- Scan Method: Electronic
- Scan Type: Sector
- Scan Width (°): 60

Verification Mode:
- Scan Method: Electronic
- Scan Type: Monopulse
- Scan Width (°): 2.3 (single beam position is assumed)

Track Mode:
- Scan Method: Electronic
- Scan Type: Monopulse
- Scan Width (°): 6 (10% of the full azimuth sector assumed for a crossing trajectory)

Transmitter
Transmitter Type: Traveling Wave Tube (TWT)
RF Minimum (GHz): 3.0
RF Maximum (GHz): 4.0
Mode: Pulsed

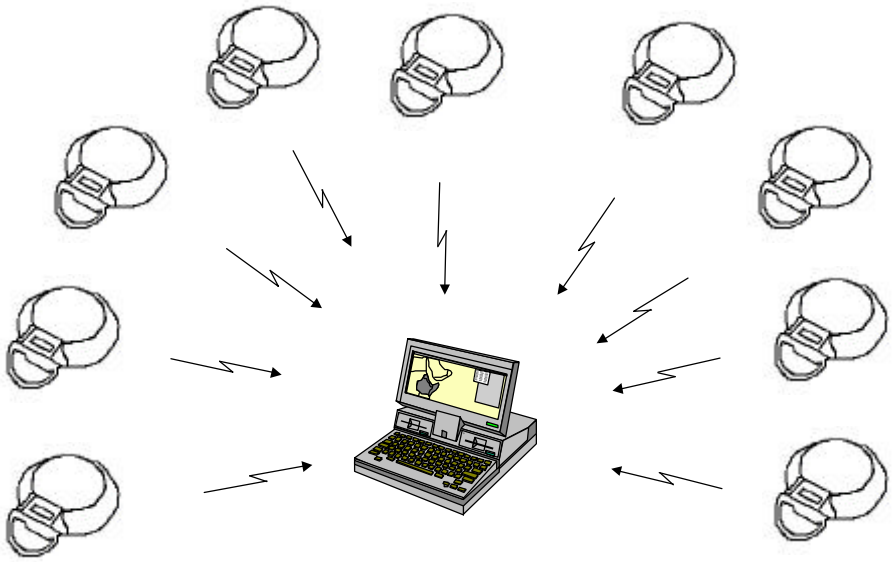
Receiver
Noise Figure (dB): 5.0
Single Pulse Processing: Coherent
Multiple Pulse Processing: MTI and Doppler Filters

Performance Capability
Detection Range (km):
- Mortar: 30.0
- Tube Artillery: 20.0
- Rocket: 40.0
- Tactical Missile: 55.0

Max Number of Targets (tracks/min):
Emplacement Time (min): 5.0
Displacement Time (min): 5.0

NOTES None

Swedish Sound Ranging System SORAS 6



For system description and operation, see NOTES

Alternative Designations: None
Date of Introduction: INA
Proliferation: At least 3 countries
Radio: INA
Calculator
Dimension:
Length (mm): 400
Width (mm): 535
Height (mm): 565
Weight (kg): 52
Memory: 200 targets
Length of microphone cable (km): 1 - 8
Data Output: Display and Paper Strip

Microphones
Total Number: 9
Dimension:
Circumference (mm): 255
Height (mm): 52
Weight (kg): 2.8
Sound Frequency (Hz): 2 to 150
Length of microphone cable (km): 1 - 8

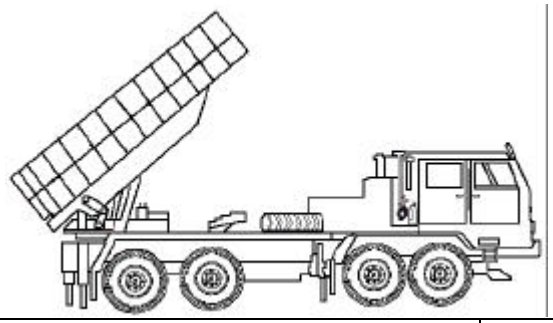
Meteorological Unit
Mast height (m): 15
Mast weight (kg): 40

Performance Capability
Detection Range (km):
Minimum: INA
Maximum: 30.0
Precision:
Under 10 km: 1% of the measured distance
Under 30 km: 2% of the measured distance
Emplacement Time (min): Varies
Displacement Time (min): Varies

NOTES
SOund RAnging System (SORAS) 6 is a fully automated, EMP-protected, completely passive sound ranging system capable of accurately locating enemy gun positions. Each microphone is surveyed into position, and acoustically designates an azimuth to each firer. The computer terminal then calculates intersection points with the azimuths, for target locations. The system operates in temperatures ranging from -40° to +55° C. Normally, it takes between 2 and 45 seconds for the calculator to calculate target coordinates. But, the target coordinate calculation time depends on the number of sound sources within the same interval of time. Nine microphones are deployed in an area 8 km wide and 1-2 km deep. The microphone positions are determined by conventional surveying methods or by special equipment. An alarm on the calculator is automatically triggered if contact is broken with any of the microphones. Two people can connect the meteorological unit and raise the mast in 15 to 20 minutes.

The above schematic is representative of the system, and does not reflect the actual Soras 6 computer terminal and associated hardware.

Chinese 273-mm Multiple Rocket Launcher WM-80



Weapons & Ammunition Types	Typical Combat Load
273-mm rocket	**8**
Frag-HE	

SYSTEM
Alternative Designations: None
Date of Introduction: INA
Proliferation: Ready for production
Description:
Crew: 5
Chassis/Carriage: TA 580 8x8 wheeled
Combat Weight (mt): 34
Chassis Length Overall (m): 9.55
Height Overall (m): 3.30
Width Overall (m): 3.06

Automotive Performance:
Engine Type: 525 hp air-cooled, diesel engine
Cruising Range (km): 400 km
Speed (km/h):
- Max Road: 70
- Max Off-Road: INA
- Cross-Country: INA
- Max Swim: N/A

Fording Depths (m): Unprepared: INA
Emplacement Time (min): 3 to 5
Displacement Time (min): 3 to 5

Radio: INA

Protection:
Armor, Front (mm): None
Armor Side (mm): None
Armor Roof (mm): None
Self-Entrenching Blade: No
NBC Protection System: No
Smoke Equipment: No

ARMAMENT
Launcher:
Caliber, Type, Name: 273-mm,
Number of Tubes: 8 (2 rows of 4 tubes)
Launch Rate:
- Full Salvo Time: 8 rounds in 5 seconds
- Single Rocket Interval: .5 seconds per rocket

Loader Type: Manual
Reload Time: 5-8 minutes
Launcher Drive: Electric
Traverse: (°):
- Left: 20
- Right: 20
- Total: 40

Elevation (°) (+/+): +20/+60°

FIRE CONTROL
Indirect Fire: INA
Collimator: INA
Fire Control Computer: None
Position Location System: None

VARIANTS
None

MAIN ARMAMENT AMMUNITION
Caliber, Type, Name:
273-mm Frag-HE, WM-80
Indirect Fire Range (m):
- Min Range: 34,000
- Max Range: 80,000

Warhead Weight (kg): 150
Rocket Length: (m): 4.58
Maximum Velocity (m/s): 1,140
Fuze Type: WJ-6A (PD)

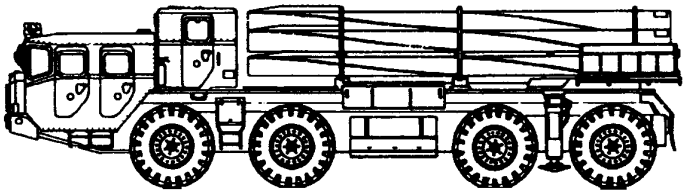
273-mm DPICM, WM-80
Indirect Fire Range (m):
- Min Range: 34,000
- Max Range: 80,000

Warhead Weight (kg): 150
Rocket Length: (m): 4.58
Maximum Velocity (m/s): 1,140
Fuze Type: MD-23A (proximity)

Other Ammunition Types: None

NOTES
The WM-80 is currently being advertised heavily on the open-market by NORINCO Industries. The WM-80 Rocket System is composed of the multiple rocket launcher, the ammunition transloader, fire command and control vehicles, and the maintenance vehicles. The fire command and control is composed of a brigade/regiment command vehicle, battalion command vehicle, surveillance/spotting radar, and meteorological radar.

Russian 300-mm Multiple Rocket Launcher 9A52-2



Weapons & Ammunition Types	Typical Combat Load
300-mm rocket	**12**
Frag-HE	

SYSTEM
Alternative Designations: 9A52-2 Smerch-M
Date of Introduction: 1989
Proliferation: At least 4 countries
Description:
Crew: 4 (7 with 9K58 Complex)
Chassis/Carriage: MAZ-543M 8x8 wheeled
Combat Weight (mt): 43.7
Chassis Length Overall (m): 12.1
Height Overall (m): 3.05
Width Overall (m): 3.05

Automotive Performance:
Engine Type: 518 hp, V-12 diesel engine
Cruising Range (km): 850 km
Speed (km/h):
- Max Road: 60
- Max Off-Road: 35
- Cross-Country: INA
- Max Swim: N/A

Fording Depths (m): Unprepared: 1.1
Emplacement Time (min): 3
Displacement Time (min): 3

Radio: R-123M

Protection:
Armor, Front (mm): None
Armor Side (mm): None
Armor Roof (mm): None
Self-Entrenching Blade: No
NBC Protection System: No
Smoke Equipment: No

ARMAMENT
Launcher:
Caliber, Type, Name: 300-mm, 9A52
Number of Tubes: 12 (3 rows of 4 tubes)
Launch Rate:
- Full Salvo Time: 12 rounds in 38 seconds
- Single Rocket Interval: 3 seconds per rocket

Loader Type: Transloader, crane hoist
Reload Time: 36 minutes
Launcher Drive: Electric
Traverse: (°):
- Left: 30
- Right: 30
- Total: 60

Elevation (°) (-/+): -0/+55°

FIRE CONTROL
Indirect Fire: PG-1M Panoramic Telescope (PANTEL)
Collimator: K-1
Fire Control Computer: None
Position Location System: None

VARIANTS
None

MAIN ARMAMENT AMMUNITION
Caliber, Type, Name: 300-mm Frag-HE, 9M55F
Indirect Fire Range (m):
- Min Range: 20,000
- Max Range: 70,000

Warhead Weight (kg): 258
Rocket Length: (m): 7.6
Maximum Velocity: INA
Fuze Type: Electronic timing (ET)

Caliber, Type, Name: 300-mm DPICM, 9M55K
Indirect Fire Range (m):
- Min Range: 20,000
- Max Range: 70,000

Warhead Weight (kg): 235
Rocket Length: (m): 7.6
Maximum Velocity: INA
Fuze Type: Electronic timing (ET)

Caliber, Type, Name: 300-mm Sensor-fuzed (MOTIV-3M), 9M55K1
Indirect Fire Range (m):
- Min Range: 20,000
- Max Range: 70,000

Warhead Weight (kg): 233
Rocket Length: (m): 7.6
Maximum Velocity: INA
Fuze Type: Electronic timing (ET)

Other Ammunition Types: Smoke, Incendiary, Chemical, Leaflet, Fuel Air Explosive (FAE), R-90 expendable miniature UAV (experimental)

NOTES
The 9A52-2 launcher with all supporting equipment, including the 9T234-2 Transloader, and the 1K123 Vivary Fire Control System, is referred to as the complex 9K58.